Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FOREST TRAILS AND LANDINGS

CODE 655

(ac)

DEFINITION

A temporary or infrequently used route, path or cleared area.

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- Provide routes for temporary or infrequent travel by people or equipment for management activities
- Provide periodic access for removal and collection of forest products

CONDITIONS WHERE PRACTICE APPLIES

Trails and landings including skid trails are applicable on forest land. They typically connect to an Access Road (Code 560).

CRITERIA

General Criteria Applicable to All Purposes

Trails and landings will be of a size, gradient, number, and location to accomplish the intended purpose and accommodate the expected equipment to be used. Avoid locating trails and landings on poorly suited soils of low-bearing strength and sites such as wetlands, riparian areas, critical wildlife habitat, or other environmentally sensitive areas. Locate trails on the contour to the greatest extent possible and incorporate breaks in grade (rolling dips or rolled grades) for trails on slopes. Skid logs uphill (with front ends off the ground) as practicable to minimize mechanical displacement of soil. Trails and landings will be set back from water bodies and water courses. Stream crossings, if necessary, will be minimized in size and number.

Assure safe ingress and egress from trails and landings to junctions with access roads. Refer to criteria in CPS Access Road (Code 560), for travel ways including logging spur roads needing construction design and possibly surfacing to accommodate frequent, intensive, or repeated vehicular traffic.

Trails and landings must be located and minimized in number and size to reduce adverse onsite and offsite impacts such as accelerated erosion, slope failure, water quality and riparian area degradation, stream channel and streambank damage, hydrologic modification, unacceptable damage to advance regeneration or residual growing stock, or fragmentation of wildlife habitat.

Those trails and landings intended or anticipated for management activities in subsequent years must be designated for reuse to minimize the need for new trails and landings and associated site impacts.

Timing and use of equipment must be appropriate for site and soil conditions to maintain site productivity and minimize soil rutting, erosion, displacement, and compaction.

Drainage and erosion control measures must be integrated with trails and landings and located to minimize detrimental effects of concentrated flow, erosion and sedimentation rates both during and after trail/landing use. Water bars, rolling dips, timber bridges, rock plunge pools, and other drainage measures for trails shall be of sufficient size, intervals and gradient for adequate drainage and erosion control.

After usage, stream crossings will be restored and stabilized. Refer to applicable drainage and erosion-sedimentation prediction technology and use CPSs such as Critical Area Planting (Code 342), Structure for Water Control (Code 587), Stream Crossing (Code 578), and Mulching (Code 484), as well as State forestry best management practices.

Noxious plants will not be used for revegetation.

Comply with applicable federal, state and local laws and regulations during the installation, operation and maintenance of this practice.

CRITERIA FOR FOREST ACCESS TRAILS

1. Location: Access trails will be located to serve the purpose intended, to facilitate the control and disposal of water, and to utilize topographic features. Trails should follow the natural contour and slopes to minimize problems with drainage patterns.
2. Gradient, Alignment, and Width: Grades should be kept below 10 percent where possible and roads should follow the contour as much as possible. Grades 15 to 20 percent may occur for short distances (200 to 300 feet). Minimum road width should be 12 to 14 feet.
   Turnouts can be constructed at intervals of about 300 feet if desired. Minimum widths of 16 feet should be used on all curves and on areas of substantial cut or fill. Access trails should not be located too close to watercourses. See section on Filter Strips for distance.

3. Filter Strips: A filter strip is a buffer of vegetation left between a disturbed area and a watercourse. Vegetation may be planted or natural. Water from disturbed areas should not only enter a buffer or filter strip, but also should be spread into the buffer. This may require placement of brush, rocks, and logs to supplement natural vegetation and litter. For additional information, see Filter Strip (Code 393). The following guide may be used according to the slope of the land:

Slope of Land (percent)	Width of Filter Strip 1/ (feet)
0	25
10	45
20	65
30	85
40	105
50	125
60	145

4. Broad Based Drainage Dips: Broad based dips should be used on permanent travel routes for removing runoff where neither intermittent nor permanent streams cross the road. Broad based dips are probably the most effective way of gathering surface water and routing it safely off the road. This type of dip should not be used on roads with grades greater than 10 percent. Crushed stone should be used on dips when slopes exceed 8 percent.
   Care should be taken to ensure adequate drainage at the out-flow of the dip and adequate buffer zone to allow filtering of the water. The discharge area should be protected with either stone, grass, sod, heavy litter, brush, logs of anything that will reduce the velocity of the water. Natural litter may be adequate in most cases if the terrain is not too steep. The correct spacing for broad based dips are as follows:

Road Grade (percent)	Approximate Distance Needed Between Dips (feet)
1	500
2	300
5	180
10	140

5. Water Breaks: Water breaks or water bars should be installed on sloping access trails and skid trails where there is a severe erosion hazard. The structures may be shallow or deep, depending on need. Deep breaks are usually used on access trails or skid trails that will be closed to vehicular traffic. Water breaks are installed at a 30-degree angle down slope. The following spacings are recommended between water breaks:

Road Grade (percent)	Approximate Distance Between Water Breaks (feet)
1	400
2	250
5	125
10	80
15	60
20	50

6. Pipe Culverts: Pipe culverts are applicable on permanent access trails where vehicular traffic will be relatively heavy. Pipe culverts should cross the road on a positive grade in line with the drainage pattern. If erosion is a problem on the inlet end, a headwall must be provided. A 12-inch pipe is the smallest that should be used. Culvert diameters for various drainage areas are as follows:

Area Above Pipe (acres)	Recommended Pipe Diameter (inches)
2	12
4	15
7	18
12	21
16	24
27	30
47	36
64	42
90	48
120	54
160	60
205	66
250	72
350	78

7. Bridges: Bridges should be used at crossings which are too large for culverts. Crossings should be at right angles to the stream. Approaches to bridges should be reasonably level for a distance of about 50 feet. Alternative road locations may be used to avoid constructing bridges.
8. Fords: Fords may be used where the stream bed is firm, banks are low and stable and the stream is shallow.

CRITERIA FOR HARVEST SKID TRAILS

Forest harvest skid trails should be planned and located to avoid damage to residual trees, minimize erosion and provide an economical route for skidding trees. Avoid joining several skid trails at one point as the disturbed area will continue to expand at the trail intersection. The gradient of skid trails should not exceed 15 percent. Sections of skid trail may be up to 20 percent if the distance does not exceed 300 feet. Do not construct skid trails straight up and down the slope but along a gradual angle across the slope to reduce the velocity of runoff water. Water bars, and other erosion control measures for harvest trails shall be of sufficient size, intervals and gradient for adequate drainage and erosion control. It may be desirable to vegetate skid trails to help reduce erosion and to enhance wildlife habitat. See NRCS Woodland Reference 16-7, “Erosion Control and Wildlife Plantings for Forestry Operations.”

CRITERIA FOR HARVEST LANDINGS

Landings are product transfer points that receive a very high volume of traffic. The landing area should be as small as possible and should be located as far away from streams as possible. At a minimum, landings should be located no closer than 50 feet from the nearest Streamside Management Zone (SMZ). Erosion control measures should be used when necessary to prevent sediment from entering into nearby streams or water bodies. Landings should preferably be located on sites with good drainage and slopes of 2 to 5 percent. Landings are areas that have high levels of human activity and often become eyesores or public health hazards because of careless littering and waste disposal. Garbage and trash generated from lunches and machinery parts packaging should be hauled away to an appropriate trash receptacle. Careless dumping of oil and lubricants must be avoided. They should be collected and disposed of in accordance with state approved waste disposal procedures.

Landings should be either site prepared and regenerated or seeded to perennial vegetation after harvesting is completed. See NRCS Forestland Reference 16-7, “Erosion Control and Wildlife Plantings for Forestry Operations.”

Logging slash and debris left on the site after harvesting will not present an unacceptable fire or pest hazard or interfere with the intended purpose.

Comply with applicable laws and regulations, including the state’s Best Management Practices (BMPs).

CONSIDERATIONS

Locate landings and trails to preserve aesthetics qualities.

Landings and trails may be closed for erosion control, safety and liability, and reduced maintenance costs.

Landings and trails may be used for wildlife food and cover plantings. Consider impacts to wildlife from increased fragmentation of the forest stand. Creation of openings can benefit some wildlife species (e.g., early successional and edge species) yet be detrimental to others (e.g., forest interior species). Consider favoring native species for revegetating trails and landings.

Slash debris and vegetative material left on the site after construction could present an unacceptable fire or pest hazard or interfere with the intended purpose.

Landings and trails may be utilized as firebreaks.

Consider cultural resources and avoid known sites.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. Specifications for revegetation of landings and trails should include species, timing and method of application.

OPERATION AND MAINTENANCE

Periodic inspections of landings and trails will be conducted and where necessary repairs will be made. Landings and trails utilized as firebreaks will be properly maintained to accomplish this purpose.

Landings and trails may be closed for erosion control, safety and liability, and reduced maintenance costs. Use Access Control (Code 472) as needed.

Landings and trails no longer needed can be “put to bed” by removing high maintenance structures, such as culverts and bridges, and can be restored to a vegetative cover by planting and seeding. Use Road/Trail/Landing Closure and Treatment (Code 654).

REFERENCES

Alabama Cooperative Extension Service. July 1994. BMP Pocket Guide for Logging. Circular ANR-806.

Alabama Forestry Commission. Alabama’s Best Management Practices for Forestry.

Garland, John J. 1997. Designated Skid Trails Minimize Soil Compaction. Woodland Workbook, Oregon State University Extension Service, EC 1110. Corvallis, OR. http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/13887/ec1110.pdf?sequence=3.

NRCS Forestland Reference 16-7, “Erosion Control and Wildlife Plantings for Forestry Operations.”

Soil Conservation Service. Forest Service. 1977. Woodlands of the Northeast – Erosion and Sediment Control Guides.

University of Minnesota. 2013. Broad-based dips. Forest management practices fact sheet: Managing Water Series. http://www.extension.umn.edu/environment/trees-woodlands/forest-management-practices-fact-sheet-managing-water-series/broad-based-dips/.